ROCKY FLATS PLANT, STAINLESS STEEL AND NON-NUCLEAR COMPONENTS MANUFACTURING
(Building 460)
SE corner of intersection of Cottonwood Ave. & Third Ave.
Golden vicinity
Jefferson County
Colorado

HAER No. CO-83-T

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
1849 C St. NW
Washington, DC 20240

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HISTORIC AMERICAN ENGINEERING RECORD

ROCKY FLATS PLANT,
STAINLESS STEEL AND NON-NUCLEAR
COMPONENTS MANUFACTURING HAER No. CO-83-T
(Rocky Flats Plant, Building 460)

Location: Rocky Flats Environmental Technology Site, Highway 93, Golden, Jefferson County Colorado. Building 460 is located in the southeast corner of the intersection of Cottonwood Avenue and Third Street.

Significance: Building 460 is a primary contributor to the Rocky Flats Plant historic district, associated with the United States (U.S.) strategy of nuclear military deterrence during the Cold War, a strategy considered of major importance in preventing Soviet nuclear attack. Building 460 was a non-nuclear manufacturing facility for the manufacture of stainless steel components. The building was designed to consolidate all non-nuclear manufacturing at the Plant into one facility. The facility was described as the most modern non-nuclear manufacturing building in the USDOE complex.

Description: The total area of Building 460 is approximately 230,000 square feet, divided between the first floor and two second floor mezzanines. The first floor (150,000 square feet) was used primarily for manufacturing. The south mezzanine, with dimensions of 240' (north-south) x 260' (east-west), houses offices and a cafeteria. The north mezzanine, with dimensions of 80' (north-south) x 260' (east-west), contains an electrical substation; control centers; vacuum pumps; a water distillation system; storage areas; and heating, ventilation, and air conditioning units. Overall building dimensions are 483' (north-south) x 362' (east-west), with a notch out of the southeast corner. Building 460 houses Rooms 122, 132, 134, 135, 141, 142, and 156-158, which are discussed in more detail below.

Building 460 is a pre-engineered metal building constructed of single-gabled, multi-span rigid-framed steel with concrete floors. The primary building structure consists of tapered rigid steel bents running east to west, spaced on 40' intervals. A reinforced concrete grade beam around the perimeter connects the spread footings and forms the foundation for the exterior walls. Cross bracing on the east and west exterior walls is used for lateral stability. Additional cross bracing is found on the mezzanine columns. The mezzanines are concrete on corrugated metal decking, supported by bar joists. Structural steel columns are used to provide intermediate support for the roof frame and mezzanine floors. The roof is supported on bar joists, with the roof ridge peaking approximately 35' above ground level. The roof system includes a corrugated metal liner, rigid insulation, and ribbed metal roof panels.

The lower exterior walls of the building are insulated pre-cast concrete panels with an architectural finish on the exterior surfaces. The upper walls are corrugated metal inner panels and ribbed exterior panels, separated by 6" metal studs and fiberglass insulation. The interior walls are concrete masonry supported on independent footings, which are as much as 9' below the finished floor elevation. Permanent mezzanine office partition walls are gypsum board over metalstuds. Interior walls and ceilings for the high-pressure test cells and radiography vaults are reinforced concrete. The high-pressure test cell walls are steel-lined.

The exterior doors are metal. The windows are fixed, single panes in metal sashing. Windows are present only on the mezzanine levels, except on the east end of the south wall where there are windows on the ground level.

Two concrete loading docks are located along the eastern side of the building, and a small loading dock is located at the west end of the north side of the building.

Utilities include steam, raw and potable water, and electricity. Building 462 is a cooling tower, which provides cooling process water for both supply and return. Liquid wastes are collected in sump tanks, then filtered and sampled in Room 140 prior to transfer to Building 374 for waste processing.

History: Building 460 was constructed in 1984 to handle non-nuclear War Reserve and special order parts and assemblies. The building was designed to consolidate all non-nuclear manufacturing at the Plant into one facility. The stainless steel operations conducted in Building 881 and some non-nuclear metal working operations from Building 444 were transferred to Building 460 after its completion. In addition to stainless steel, parts were also manufactured from aluminum, vanadium, copper, gold, silver, magnesium, titanium, Teflon®, and plastics. Manufactured components were used in the tritium reservoir-to-pit delivery system in nuclear weapons. No major modifications have been made to the building structure since it was commissioned, although several pieces of equipment have been disassembled for shipment to a U.S. Department of Energy (USDOE) facility located in Kansas City. The final production run was completed in September 1994.

Operations: Building 460 housed equipment, systems, and personnel for fabrication, assembly, and testing of stainless steel components such as reservoirs, tubes, and non-fissle trigger components. Manufacturing, testing, and inspection processes occupied most of the ground floor. The facility was described as the most modern non-nuclear manufacturing building in the USDOE complex.

Operation processes included fabrication, assembly, and inspection. Fabrication of stainless steel and other non-nuclear metal parts included mechanical machining, electrochemical machining and grinding, electric discharge machining, and crush grinding. Mechanical machining took place in Room 134 and consisted of production machining and hardware machining. The electrochemical machining operations were located in Room 141. Various grinding processes took place in Room 142.

Assembly took place in Rooms 122, 132, 134, and 135 and included a combination of machining, joining, grit blasting, and cleaning. Cleaning processes, including acid, aqueous, and final, were conducted in Rooms 156, 157, and 158. Acid cleaning consisted of a detergent wash, followed by a series of acid and water washes and rinses. Aqueous cleaning consisted of a detergent wash, followed by a deionized water rinse. The final cleaning process was the last cleaning the part or assembly underwent, and consisted of a detergent wash, followed by a series of deionized water or isopropyl alcohol rinses.

Assembly testing, non-destructive testing, and product inspection were conducted during inspection of the machined parts. Assembly testing subjected parts and subassemblies from various fabrication processes to pressure and leak tests. Non-destructive testing included ultrasonic testing, holographic pressure testing, radiographic testing, and dye-penetrant testing. Ultrasonic testing used water and ultrasonic pulses to detect voids and other defects in welded joints of parts and subassemblies. Holographic testing used a holographic plate to record expansion or distortion of a tested part or subassembly placed under pressure in a test cell. Radiographic testing used x-rays to detect internal flaws (i.e. cracks, lack of fusion, and inclusions) in parts and subassemblies. Dye-penetrant testing used dye penetrant oil to detect surface cracks and other defects in parts and subassemblies. Product inspection, used to provide quality assurance for parts fabricated in the building, or purchased from off site, consisted of a series of cleaning and non-dimensional inspection processes.

Other activities conducted in Building 460 included research and development on prototype fixtures, and parts and materials development. Support operations housed in the building included machining and gauging, production control, product definition, deionized water production, test cell compression, laboratories, maintenance, and utilities.

Sources: Colorado Department of Health. *Project Tasks 3 & 4 Final Draft Report. Reconstruction of Historical Rocky Flats Operations and Identification of Release Points (1992),* by ChemRisk. Rocky Flats Repository. Golden, Colorado.

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